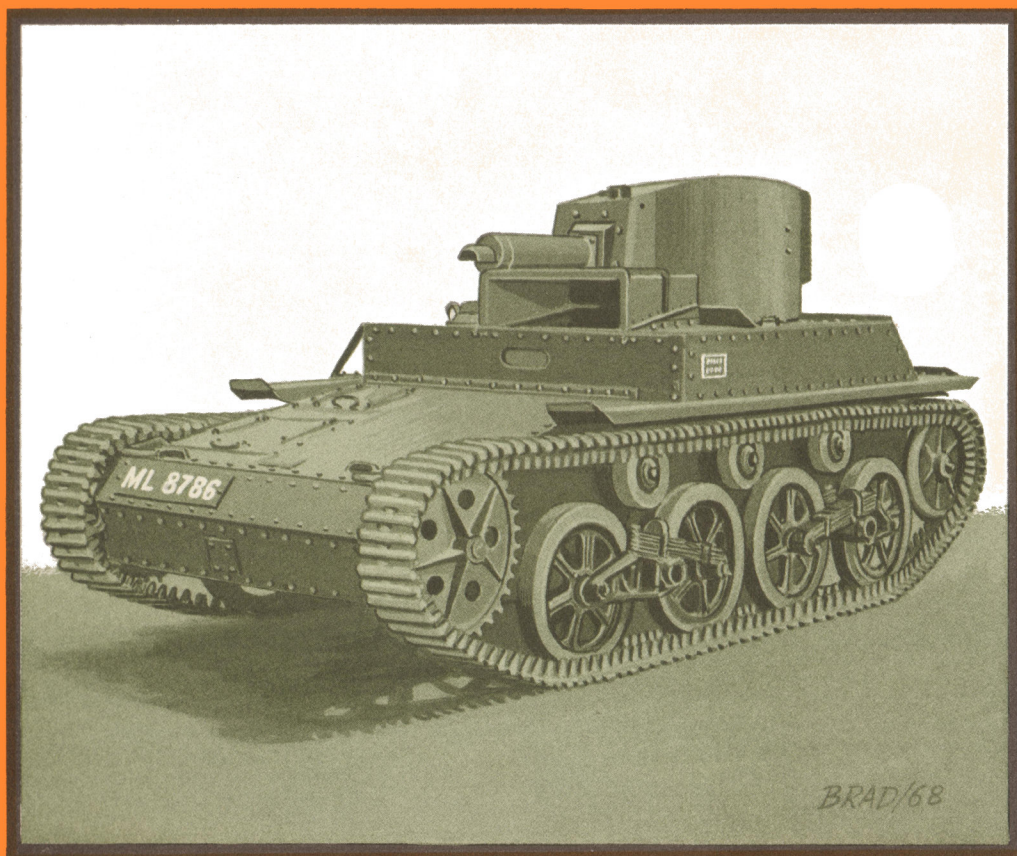


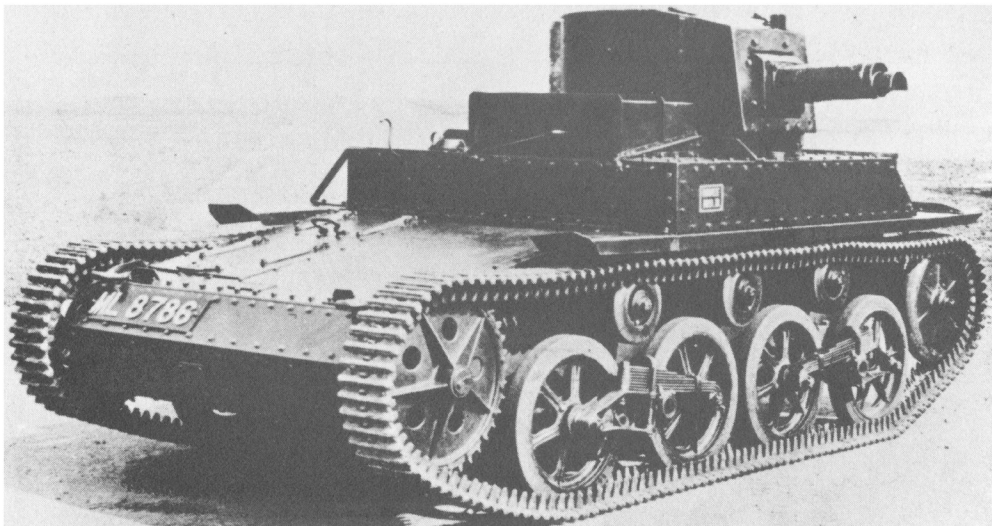


SERIES SIXTEEN

Light Tank Mark I	(UK)
Panzerkampfwagen 'Panther' Ausf G.	(GE)
Armoured Car, AEC Mark I	(UK)
Infantry Tank Mark I	(UK)



MILITARY VEHICLE PRINTS



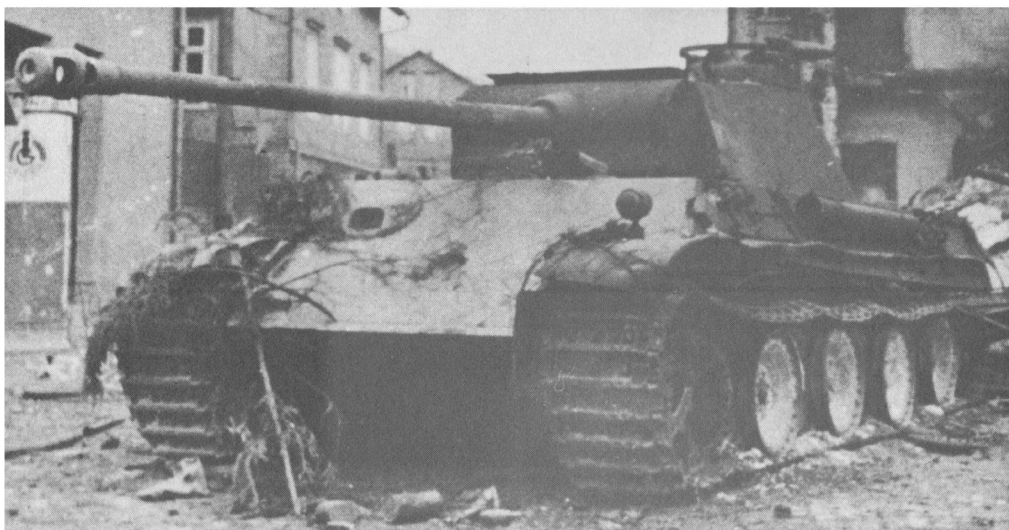
ABOVE: The Light Tank Mark I or Carden-Loyd Mark VIII. This particular vehicle in our photograph is the A.4.E2 version. It is a most important type as many of the features found on these vehicles were to manifest themselves in all future light armoured vehicle designs. (Imperial War Museum Photograph)

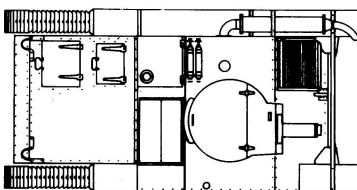
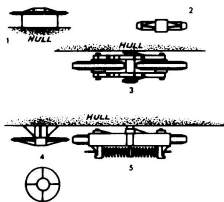
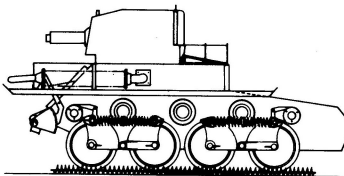
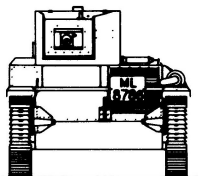
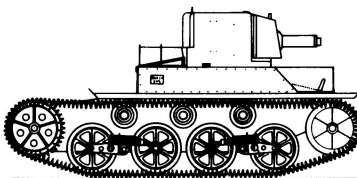
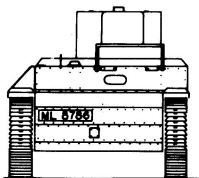
Cover Illustration - Drawn by George Bradford.

Success of the Carden-Loyd Mark VI machine gun carrier, as far as the company was concerned, prompted further development. The logical step was the provision of a rudimentary turret on the existing chassis to give full traverse with protection for the gunner. This became the Vickers-Carden Loyd Patrol tank. However, it was really a makeshift vehicle and the additional weight hindered performance. Carden-Loyd meanwhile undertook the work of perfecting this idea of light tanks and shortly produced the Mark VIII which became the Light tank Mark I. This vehicle is the subject of our cover drawing as it represented a most important vehicle in the development of most other light tanks that were to follow. The colour scheme was quite simple, overall green, black number plate with white letters and the model number in white on the sides.

The A4.E3 Anti-aircraft tank was a more interesting vehicle from the point of view of the colour scheme, for it appeared painted in the disruptive camouflage which was common in 1930.

BELOW: This late model of the 'Panther' Ausf G., as shown in our drawing, was destroyed during the American 1st Army advance in Central Germany. The town was Haiger and the vehicle was destroyed during the last few days of March 1945. (U.S. Official Photograph)

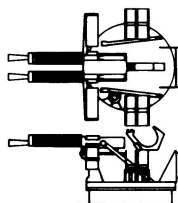




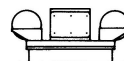
CONTROLLED SCISSORS SUSPENSION

DETAILS

1. Plan of final drive on right side.
 2. Section through road wheel
 3. Plan of slow motion suspension
 4. Section through left sprocket, elevation of boss
 5. Plan of Horstman suspension
- Basic vehicle E4, turret traversed to rear. Drivers cowl up
Hull profile includes later Horstman suspension, shock absorbers,
eccentric axle, ratchet with pawl and tension spring.
Springs: 8 leaves front, 7 leaves rear (10 all round on E2)



A4 E2 TURRET



A4.E2, E3, E4 and E5

LIGHT TANK Mark 1

LIGHT TANK Mk I

SCALE 1:76 (4mm. to 1 foot) Drawn by A. GOUGH

LIGHT TANK MARK I.

The Carden-Loyd Company produced a successful series of machine-gun carriers or 'tankettes' between 1924 and 1928. In, 1928 Vickers-Armstrong absorbed the company, later producing the Carden-Loyd Mk.VI machine-gun carrier which was accepted into service with the British Army. This was the first type to be produced in quantity and from this development branched out on three separate paths; machine gun-carriers, commercial light tanks and the series of light tanks built to G.S. Specifications.

The first light tank specification A4 E1 was issued in 1929 resulting in the Carden-Loyd Mk VII being produced. It was the first light tank designed as such to be produced by Carden-Loyd and was a two-man vehicle with a turret mounted machine-gun. The suspension was on the same principle as their Mk.VI excepting that four larger diameter road wheels were used each side and were of the 'solid' type with ribbed spokes on their inner face, the rear idler being identical with the road wheels. This tank proved to be sufficiently promising for four further vehicles of an improved type to be ordered, A4.E2-E5 or Carden-Loyd Mk.VIII which became known officially as Light Tank Mk.I.

These four vehicles were similar to their predecessor, the basic hull shape remained the same although it was extended at the rear. The suspension retained the larger road wheels but these were of the six-spoke variety which remained virtually unchanged throughout the series of Light Tanks and Universal Carriers. The springing arrangement was new and was of the slow motion type consisting of adjacent wheels pivoted to the hull via a pair of leaf springs and a bogie frame. New pattern idler and drive sprockets were introduced. A new circular turret offset to the left carried a single vickers.303 water-cooled machine-gun in a block mounting. The Driver was seated at the left front with the Commander who acted as his own Gunner and Loader occupying the Fighting compartment immediately behind the Driver. The engine was a Meadows 6EPT producing 60 bhp at 3000 rpm and delivered the power via a Meadows single dry plate clutch, Meadows 4 forward and 1 reverse speed gearbox and steering clutches and brakes to the single ring 40 tooth sprockets at the front. The engine was mounted longitudinally at right front of the vehicle alongside the Drivers' and Fighting compartments. The radiator was mounted at the rear of the vehicle and expelled the cooling air through the louvers. Armour thickness varied between 14 mm and 4 mm and was bolted to mild steel angles. Steering was by clutch and brake, partial movement of the steering lever disengaged a multi-plate dry clutch by rotation of cam faces against clutch withdrawal forks. Continued application of that lever applied a steering brake by toggle action.

These four vehicles were used extensively for trials and were modified to incorporate various improvements and experiments. Amongst these were the A4.E3 which was modified to mount a pair of .5in Vickers AA water-cooled machine-guns on an open ring mounting and first appeared in 1930 with a disruptive camouflage that enjoyed a brief spell of popularity at the time. It was thus the first anti-aircraft tank. These Vickers guns were belt fed from reels with stowage for four additional reels. This vehicle led to further trials being carried out through the thirties on other turrets and vehicles for anti-aircraft work.

The A4.E4 was modified to take the new Horstmann single coil spring suspension and incorporated friction type shock absorbers on the front and rear stations. The A4.E5 was also fitted with the Horstmann suspension but further modified to a 'controlled scissors' suspension which allegedly dispensed with the need for shock absorbers, although users disagreed. All five vehicles discussed here were designated as follows:-

A4.E1 MWEE 128 T 1022 ML 8726 Carden-Loyd Mk.VII.
 A4.E2 MWEE 189 T 491 ML 8784)
 A4.E3 MWEE 189a T 492 ML 8785) Carden-Loyd Mk.VIII
 or
 A4.E4 MWEE 189b T 493 ML 8786)
 A4.E5 MWEE 189c T 494 ML 8787) Light Tank Mk.I

The A4.E1 was eventually sold in July 1936 while work ended on the remaining four vehicles in January 1933.

Technical Specification for Light Tank Mk I (A4.E2,E3,E4 and E5)

Crew: 2
 Weight, Combat loaded: 8960 lbs. 4 Long tons, 4.48 Short tons,
 4.06 Tonnes.

Performance

Speed, Max. Road: 32 m.p.h. (52 Km.p.h.)
 Fording depth: 2' 6" (76 cm)
 Trench crossing: 5' 0" (152 cm)
 Step: 2' 1" (63 cm)
 Ground pressure: 6.37 lbs/sq.ins (.448 Kg/sq. cm)
 Range (internal fuel), Road: 160 Miles (256 Km)
 Power to weight ratio: (Gross) 15 HP/ton

Dimensions

Length overall: 11' 11" (363 cm)
 Height: 5' 6" (167.6 cm)
 Ground clearance: 10½" (26.7 cm)
 Fire height of gun: 4' 6" (138.1 cm)
 Road wheel dia (overall) 1' 8" (50.8 cm)
 Road wheel Width: 2½" (6.35 cm)

Trackwork

Centres: 5' 2" (157 cm)
 Length on ground: 6' 0" (182.8 cm)
 Width: 9.5" (24 cm)
 Pitch: 1.758" (4.47 cm)
 Number of links per track: 169
 Type: Forged Steel, Dry pin.

Mechanical Details

Engine: Meadows 6 EPT, 6-cylinder in-line, OHV Water-cooled, normally aspirated gasoline, spark ignition, bore x stroke 3" x 3½" = 201 cu.in. (76 x 120 mm = 3301 cc) compression ratio 5:1
 B. H. P. 41 @ 1500 R.P.M, Max 60 @ 3000 R.P.M.
 (Engine, Clutch and Gearbox weight 784 lb)
 Transmission: Single plate dry clutch and 4F and 1R crash Gearbox
 40 Tooth single Ring Sprocket 22.38" P.C.D.
 Steering: Multi-Plate Dry Clutch and Brake.
 Suspension: Slow motion with quarter elliptic leaf springs.
 Horstmann with single coil springs.

Armament

Main: 1 - .303" (RC) Vickers water cooled machine gun in
 Block mounting or 2 - .5" AAHMG, Vickers water cooled.

Stowage

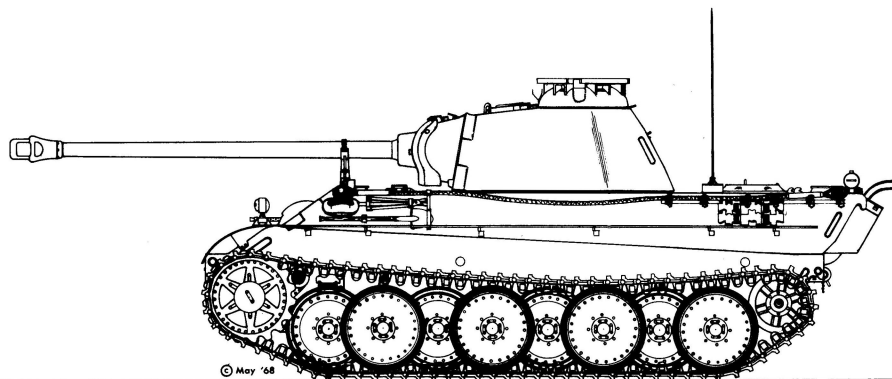
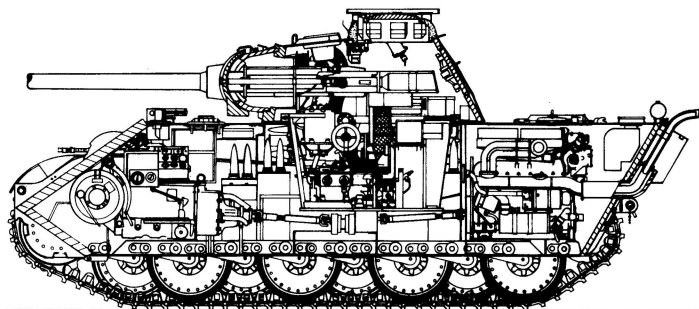
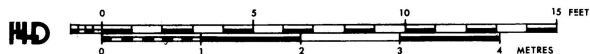
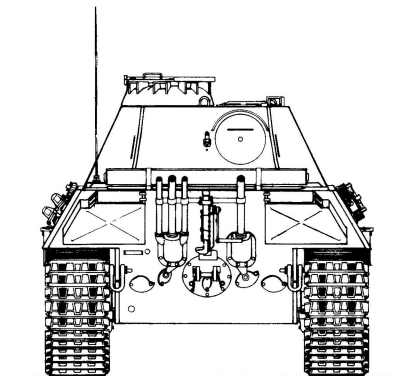
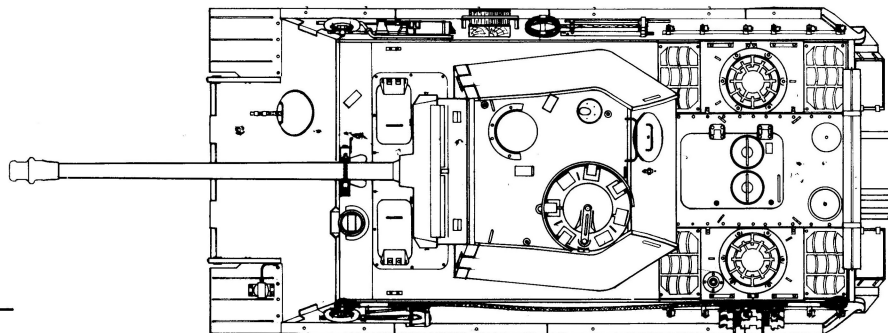
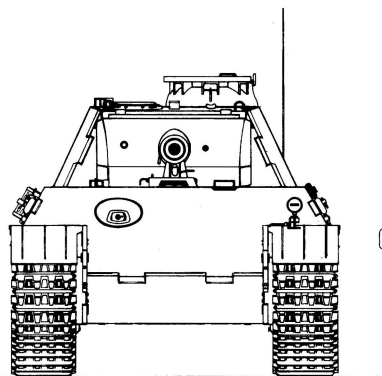
Ammunition, main armament: 4000
 Internal Fuel capacity: 25 - 27 Imperial Gals.
 30-32.4 U.S. Gals. 113.6 - 122.7 Litres.

Armour

Type: Rolled steel bolted plates 14mm max. 4mm min.
Hull, Nose upper: at 40 degrees
 Nose lower: at 22½ degrees
 Glasis plate: at 82 degrees
 Drivers plate: 0.55" (14mm) at 0 degrees
 sides, 0.354" (9mm) at 0 degrees
 rear, 0.157" (4mm) at 43 degrees
 decking, 0.197" (5mm) at 90 degrees
 belly, front at 72 degrees and 67 degrees

Turret. All vertical plates.

NOTE: British Standard Angles: 0 degrees = Vertical
 90 degrees = Horizontal



© May '68

PANZERKAMPFWAGEN 'PANTHER' AUSF. G.

SCALE 1:76 (4 mm to 1 foot) DRAWN BY H.L.DOYLE.

Panzerkampfwagen 'Panther' Ausfuehrung G. Sd kfz 171 - 1944/45.

Historical research by Walter J. Spielberger.

Orders to create replacement vehicles for the Panzerkampfwagen IV were placed by the German Ordnance Department as early as the Spring of 1937. The vehicle was to be in the 30 ton class armed. Henschel, Daimler-Benz, M.A.N. and Porsche were engaged in this venture. By 1941 all companies had completed prototype vehicles such as the Porsche Type 100 (VK 3001 P) (Bellona Prints Series 14, No.55 GE). But since the Pz.Kpfw IV had proved an adequate vehicle no plans were made to order any of these vehicles.

As so often mentioned before, one of the most momentous occurrences in the Armour field was the appearance of the Russian T.34 in the Autumn of 1941. This vehicle overnight rendered all the existing Armoured vehicles obsolete. All previous designs were frozen, Henschel and Porsche were asked to mount an 8.8 cm gun in their 45-ton vehicles, while Daimler-Benz and M.A.N. were ordered to create a 30-ton vehicle incorporating all the best features of the T.34. Designs were ready by April 1942. The M.A.N. version was finally accepted for production and a prototype appeared in September 1942. Production of the first model - the Ausf D commenced in November 1942.

In February 1943 the Ordnance Department asked both Henschel and M.A.N. to co-operate closely to develop a more advanced 'Panther' which would have as many as possible of its components interchangeable with those of the 'Tiger II'. During the design study for this vehicle and the Jagdpanther (Bellona Prints, Series 8, No.31 GE) several improvements were evolved which could be incorporated in the then existing Panther vehicle - Ausf A. These were incorporated in vehicles which appeared in early 1944 and a new designation was allocated to this Panther, the Ausf G. To assist production and at the same time improve protection for the sides and petrol tanks, a new single piece upper side plate was used. The drivers visor formerly on the glass plate was replaced by a periscope. New hull hatches were fitted which folded back rather than the pivoted type of the earlier Panthers.

Meanwhile production was stepped up at all the five plants involved in Panther production. These were Henschel, Maschinenfabrik Augsburg-Nuernberg AG, Daimler-Benz AG, Maschinenfabrik Niedersachsen-Hannover, and Demag AG. Between the beginning of 1944 and the cessation of hostilities 3740 Panthers were built and even in February of 1945 a total of 135 units left the factories. By the Autumn of 1944 a new plan for production during the coming year was issued by the German High Command. Only two tanks with fully traversing turrets were retained by the programme, the 'Panther' and 'Tiger' Ausf B. The fact that the same amount of man hours were now only needed to produce two Panthers for each 'Tiger' tipped the production scales in favour of the Panthers. It was contemplated to reach an output of 400 Panthers and 150 Jagdpanthers per month.

Battle experience brought requests for improvements. The main improvement was to the Mantlet - a new one, as shown on our drawing was no longer curved inwards at the bottom. With the previous mantlet heavy shells unable to penetrate the thick armour were frequently deflected downwards through the roof of the hull. By the end of 1944 work on the Panther II had advanced considerably, and this Panther was the Ausf.F. It was to receive a new turret similar to that of the 'Tiger' Ausf B. One of the standardised features was the running gear which used the same steel rimmed wheels and fittings as the Tiger. This feature appeared on existing Panthers during the last days of 1944. (The new trackwork layout will be featured on our Bellona Print of the Panther II planned for the near future). Further improvements to be added to 'Panther' Ausf G. and 'Tiger' Ausf B. as the war ended, were infra-red lighting devices, stabilised gun mounts which would have drastically improved battle performance of these fine tanks. The Maybach HL 230 engine in use was improved raising its output to 800 bhp by higher compression ratio, Petrol injection and improved cooling. These engines were to be in the tanks produced from mid 1945. A further boost to 900 bhp was planned and had in fact been under test, this used a supercharger.

In little over two years of production 5588 Panther battle tanks were recorded as having been built, while an additional 679 chassis were utilised in the production of the recovery 'Bergepanther' and the 'Jagdpanther'. A total chassis production of 6187. Taking the revolutionary features of the T 34 a step further German industry created one of the finest Tanks built.

Very many Ausf. G. had exhaust systems and engine covers similar to those illustrated in our Jagdpanther drawing (Series 8 No. 31 GE)

Technical Specification for Panzerkampfwagen "Panther" Ausf GCrew: 5

Weight, Combat loaded: 99873 lbs. 44.59 Long Tons/49.9 Short tons.
45.3 Tonnes

Performance

Speed, Max. Road: 28.39 m.p.h. (45.7 Km.p.h.)

Cross country: 15.5/18.6 m.p.h. (25/30 Km.p.h.)

Max. Gradient: 30 degrees

Fording depth: 6' 2 3/4" (190 cm)

Trench crossing: 8' 0 1/2" (245 cm)

Step: 2' 1 1/2" (90 cm)

Min. Turning circle: 33' (10 metres)

Ground pressure: 12.37 lbs/sq.ins (0.87 Kg/sq.cm)

Range (internal fuel), Road: 124 Miles (200 Km)

Cross country: 62 miles (100 Km)

Power to weight ratio: Gross 15.6 Metric HP/tonne

Dimensions

Length overall: 29' 0 3/4" (886 cm)

Length: 22' 9" (693.5 cm)

Width overall: 10' 8 3/4" (327 cm)

Height: 9' 10" (299.5 cm)

Ground clearance: 1' 10" (56 cm)

Fire height of gun: 7' 7" (230 cm)

Turret ring dia: 5' 5" (165 cm)

Road wheel dia (overall) 2' 9" (86 cm)

Road wheel width: 4" (10 cm)

Trackwork

Centres: 8' 7" (268 cm)

Length on ground: 12' 10 1/2" (392 cm)

Width: 2' 2" (66 cm)

Number of links per track: 87. Type: dry, single pin

Mechanical Details

Engine: 1 x Maybach HL 230 P30. V.12 (60 degree) O.H.V.

Water cooled Petrol of 23.88 litres developing 700 b.h.p.
(metric) at 3000 r.p.m. 6.8 to 1 compression ratio
12 volt Electrical system.

Transmission: ZF AK 7-200 (Late models as in drawing ZF AK 7-400
with lower ratios, as fitted in Jagdpanther)

Steering: Man Multi-geared

Suspension: 2 transverse torsion bars per roadwheel.

Armament

Main: 1 x 7.5 cm KwK 42

Calibre, and length in calibres: 75 mm (2.952 ins), L/70

Traverse: 360 degree turret Operation: Power take-off and hand.

Elevation: plus 20 degrees, minus 4 degrees.

Secondary Armament: 1 x 7.92 mm MG 34.

(Co-Axial) 1 x 7.92 mm MG 34 in Hull, ball mount

(Optional) 1 x 7.92 mm MG 34 on Cupola ring

1 x 9 mm MP 38 or 40

1 x Nahverteidigungswaffe

Stowage

Ammunition, main armament: 82 rds

Ammunition, secondary armament: 4200 rds. 7.92 mm

Internal Fuel capacity: 162 Imp. Gals. 194 U.S. gals. 730 Litres.

Armour

Type: Rolled homogeneous plate interlocking stepped joints,
welded construction.

Hull, Nose upper: 3.144" (80 mm) at 35 degrees

Nose lower: 3.144" (80 mm) at 55 degrees

Sides, upper: 1.572" (40 mm) at 60 degrees

lower: 1.572" (40 mm) at 90 degrees

Rear, 1.572" (40 mm) at 60 degrees

Decking: 0.595" (15 mm) at 0 degrees

Belly, Front: 0.786" (20 mm) at 0 degrees

Rear: 1.015" (13 mm) at 0 degrees

Turret

Front: 3.936" (100 mm) at 80 degrees

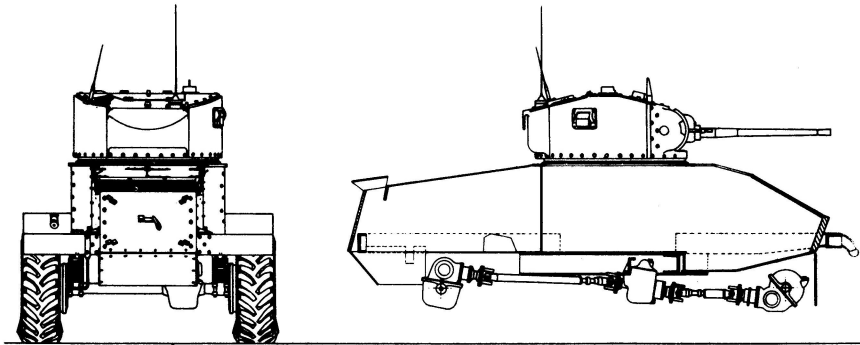
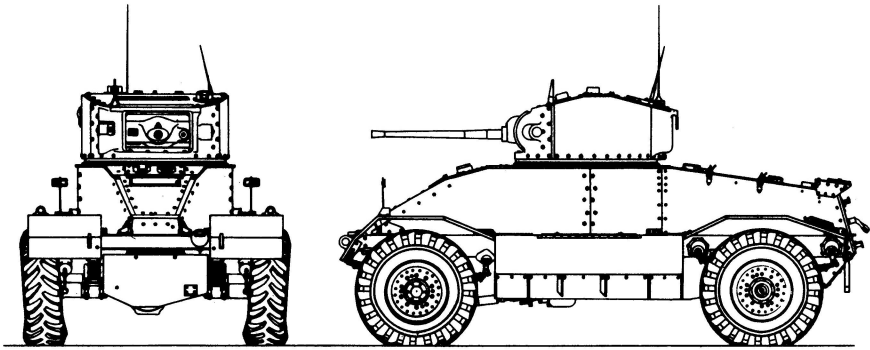
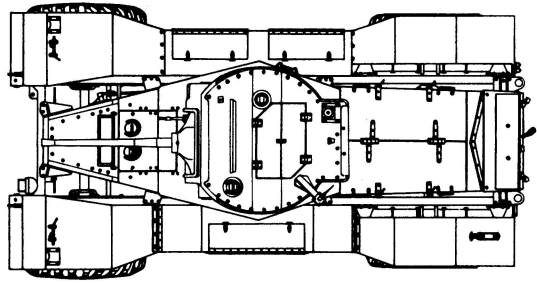
Sides: 1.764" (45 mm) at 65 degrees

Rear: 1.764" (45 mm) at 62 degrees

Roof: 0.595" (15 mm) at 6 and 0 degrees

Mantlet: 4.716" (120 mm)

NOTE: German standard Angles; 0 degrees - Horizontal;
90 degrees - Vertical



ARMoured CAR, A.E.C. Mark 1.

SCALE 1:76 (4mm. to 1 foot). Drawn by A.J.KAYE.

Armoured Car AEC Mark I

The AEC Armoured Car was conceived about 1940-41 at a time when reports were coming from N. Africa concerning the superior speed and fire-power of German Tanks.

The chief Engineer of the Associated Equipment Co. Ltd, who was at the time a member of the Ministry of Supply Tank Design Committee, concluded that the answer to this disparity was the production of a fast and heavily armed "Wheeled AFV". Although his ideas did not impress the T.D.C. they did interest AEC's Chairman and a mock-up vehicle was produced. Official interest still remained non-existent however, until the mock-up, now gaudily painted 'gate crashed' an official parade of vehicles on Horse Guards Parade. There, the vehicle caught the eye of the Prime Minister, among many others, and in due course an order was received for a number of armoured cars to be built, based on the design of the mock-up.

The basic concept of the Armoured Car AEC Mk I was a combination of a Vickers Armstrong tank turret (As fitted to the Valentine Mk I.) with a hull and chassis incorporating components from the Matador Artillery tractor.

The AEC was a 4-wheel Drive vehicle; under normal conditions the drive was to the front wheels, the hubs and axle incorporating Tactra C.V. joints. For 4-wheel drive the rear wheels were driven through a propshaft and differential from an auxiliary gearbox in the centre of the vehicle, unlike the Daimler Armoured Car, no special provision was made for driving in reverse. AEC gave it their Model No.0855.

The engine used was basically the same 6-cylinder 7.58 Litre diesel unit used in the Matador, however the power output was raised to 105 bhp at 2,000 rev/min from the 95 bhp at 1,800 rev/min of the Matadors A 187 engine.

Installation of the engine was such that it was inclined in both elevation and plane to the right of the rear engine compartment, the left side of which was occupied by a 33 gallon fuel tank. This arrangement permitted a lower vehicle and also a straight transmission line to the front axle. The crew of the vehicle consisted of a Driver, Commander and Gunner. The driving compartment at the front was entered by a hatch in the roof. For normal driving this was left open, the drivers seat being locked in a raised position. Two periscopes were provided in the hatch for driving while closed down.

The Commander and Gunner were positioned to right and left of the fighting compartment, access to which was via a hatch in the turret roof. The turret was provided with a variable speed electric traverse, plus a geared hand wheel for emergency use, both of which were operated by the Gunner. The main armament was shoulder controlled in elevation, and on the right hand side of the turret was an independently controlled 2" smoke discharger. The rear of the fighting compartment housing the engine air cleaners, engine driven ventilation fan and other apparatus.

The vehicle drawn represents a pre-production Mark I which only has one pistol port, in the turret side. The production Mk I however, was fitted with two pistol ports, the left hand one being turned through 90 degrees so that a steel reflector on the inside acted as a rear view mirror when the port was opened. Other differences to be found on the production vehicle include, additional protection for the armour joint at the top corners of the fighting compartment, slightly different mantlet for the BESA MG, dust shields on the periscopes and modified front spring shackle.

A total of 122 AEC Mk I's were built, and began to appear in the heavy troops of the Armoured Corps Regiments from 1942 onwards. The KDG received one AEC per troop in January 1943 and later in November re-equipped with AEC's and Humbers. The vehicle was also used by the Royals, both in N. Africa and Italy, and in the later Marks, in North West Europe.

Several AEC Mk I's were modified in N. Africa at the Middle East Mechanisation Experimental Department. One was converted to take a 6-pounder gun, and two were modified to push a spiked roller ahead of them in order to locate minefields for subsequent sweeping by Scorpions. (The armour thickness given in the data table are estimated thicknesses taken from a sectional drawing. Also estimated is the maximum speed which is based on a governed engine speed of 2,000 rpm in top gear.)

Technical Specification for Armoured Car A.E.C. Mk.I

Crew: 3

Weight, Combat loaded: 24,640 lbs.

11 Long Tons, 12.32 Short Tons.

11.176 Tonnes.

Performance

Speed, Max. Road: 35 Estimated m.p.h. (56.3 Km.p h.)

Min. Turning Circle. 60' 0" (183 metres)

Dimensions

Length overall: 17' 0" (518 cm)

Width overall: 9' 0" (274 cm)

Height: 8' 4½" (255 cm)

Ground Clearance: 1' 0½" (32.1 cm)

Fire height of gun: 7' 1" (218 cm) Est from Drg.

Turret ring dia: 4' 5½" (135 cm) " " "

Wheels:

Type: 13.50 x 20 RF.

Pressures: F. 30 16/mm R. 35 16/mm.

Mechanical Details

Engine: 1 x A.E.C. Type A 195 6 Cylinder Water Cooled Diesel
7,580 cc OHV 105 B.h.p. @ 2000 rev/min (Governed)
Cooling by Radiator, Fan and Pump.

Transmission: Single Plate clutch, Main gear box 4 forward 1 reverse
Ratios, 2 Ratio Auxiliary Gear Box giving 2 or 4 wheel
drive. Propshafts to fully floating F & R axles with
double reduction, bevel & double Helical gears.
Front axle with Tracta C.V. Joints.

Armament

Main: 1 x 40 mm. 2 pounder. Calibre: 40 mm.

Traverse: 360 degrees. Operation: Electric variable speed or hand geared
Elevation: plus 15 degrees, minus 15 degrees (estimated)

Secondary Armament

1 x Machine Gun, BESA, 7.92 mm Co-Axial

1 x .303" Bren Mk. I with Lakeman A.A. Mount

1 x 2" Smoke Discharger

Stowage

Ammunition, Main Armament: 58 Rounds.

Secondary: 7.92 mm BESA 2,925 rounds (13 boxes)

.303" BREN 600 rounds (6 A.A. Drum magazines)

2" Smoke discharger 18 rounds. Hand grenades (No.36 MK 1) 6.

Internal Fuel capacity: 33 Imp. gals.

Armour

Nose, upper: 2¼" (57 mm) at 20 degrees

lower: 5/8" (15.9 mm) at 76 degrees.

Glacis plate: 1¼" (31.8 mm) at 60 degrees.

Drivers plate: ¾" (19 mm) at 75 degrees.

Hull top: ¾" (19 mm) at 90 degrees.

Sides

Front: 1½" (44.4 mm) at 0 degrees.

Rear: (fighting Comp) 1½" (44.4 mm) at 0 degrees.
(Engine Comp) 5/8" (15.9 mm) at 0 degrees.

Rear

Upper: 1½" (31.8 mm) at 25 degrees.

Lower: ¾" (6.45 mm) at 50 degrees.

Engine Compartment:

Top: 3/8" (9.5 mm) at 82 degrees.

Belly: 3/8" (9.5 mm) at 0 and 90 degrees.

NOTE: - British standard Angles = 0 degrees = Vertical
90 degrees = Horizontal

Vision Arrangements.

Commander 1 x Vickers tank periscope.

Gunner 1 x Vickers tank periscope.

Driver 2 x Vickers tank periscope.

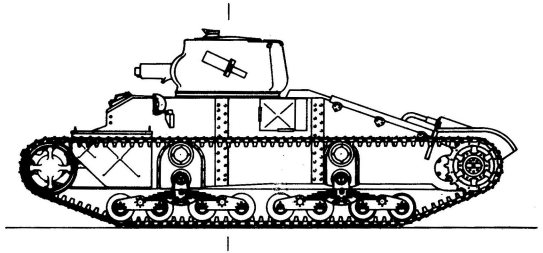
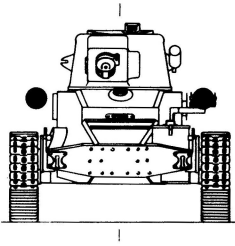
Communications: 1 x No. 19 W.T. Set.

Steering: A.E.C. worm & nut type. 6½ turns lock to lock.

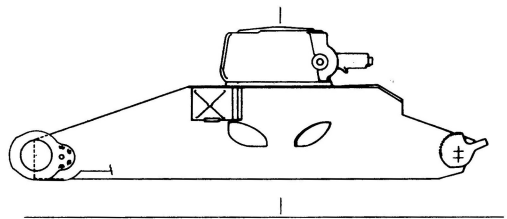
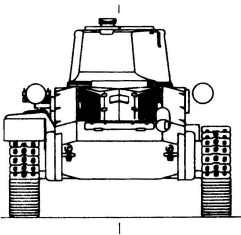
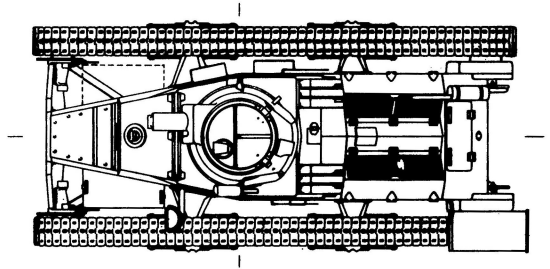
Suspension: Fully floating F & R axle. With semi elliptic laminated
leaf springs

Brakes Compressed air operated drums 17" x 3" front, 17"x 6" rear.

Hand brake: Mechanical, rear wheels only.



RIGHT HAND HEADLAMP BRACKET,
STOWAGE BIN, MUDGUARD AND SMOKE
DISCHARGER OMITTED TO REVEAL FUR-
THER DETAIL.
RIGHT HAND ELEVATION SHOWS HULL
PROFILE ON CENTRE LINE WITH ADD-
ITIONAL TOW ROPE STOWAGE BINS,
TRACK TENSIONING CAM WITH 18T
RATCHET AND FINAL DRIVE CASING.
INSET PLAN VIEW OF R.H. REAR SUS-
PENSION BOGIE BRACKET WITH RET-
URN ROLLER REMOVED SHOWS L to R
RUBBER WHEELS AT STATIONS 5 & 6
AND STEEL WHEELS AT STNS. 7 & 8.
FRONT ELEVATION OF R.H. BOGIE
MOUNTS, FRONT AT LEFT.
NB. FINAL DRIVE CASING MOUNTED
ON HULL SIDE PLATE (60mm) EXT-
ENSIONS.



INFANTRY TANK Mark 1

SCALE 1:76 (4 mm. to 1 foot) Drawn by A. GOUGH

Infantry Tank Mark 1 (A11) 1935-39

In April 1934 the CIGS Research Committee prepared their outline requirements for two types of Infantry Tank. The first was for a small tank with a .303 in or .5 in machine-gun which was to be used as a mobile machine-gun post. The second was to be a larger tank mounting the new 2-pdr gun capable of defeating enemy tanks and prepared machine-gun positions. Both types were to have a minimum 1 inch armour all round and a speed of 10 mph. Only the smaller one was to be built in the near future.

In May 1934 General Sir Hugh Elles, who had been the Commander of the Tank Corps during the Battle of Cambrai 1917, became Master General of the Ordnance. His experience in Armoured Warfare led him to invite Sir John Carden of Vickers to develop a tank which would have sufficient armour thickness to withstand fire from any contemporary anti-tank weapon. Two months after commencing work on this tank, Carden was killed in an air crash on the 10th December 1935.

The pilot model, A.11 E1 appeared in September 1936 and was delivered to the Mechanization Experimental Establishment for trials. It bore the Road Registration number CMM 880 and was given the WD No. T 1724. Since the design was limited by cost, it adhered very closely to the essential requirements. Featured for the first time on a British tank was a cast turret. Armament as planned consisted of a single .303 in. Vickers machine-gun in the turret, although later some of the production vehicles mounted a 0.5 in. machine-gun. A commercial Ford V-8 engine gave a top speed of 8 mph and the transmission and suspension incorporated components from the highly successful Vickers Six Ton Tank. Armour thickness was 65 mm at the front and 60 mm at the sides giving a combat weight of 11 tons.

During trials it proved to be very reliable mechanically but objections were raised to its single machine-gun armament. A more powerful armament and a three-man turret were considered essential so the A.12, the second larger type was put in hand immediately. (Matilda, Infantry tank Mark 11 Bellona Prints Series 3. No.11 UK)

The Infantry Tank Mk.1 was put into limited production as a 'stop gap' and 60 vehicles were ordered by the War Office in June 1937 (T3433-T3492) the first 16 vehicles being delivered in Autumn 1938. A further 60 were ordered in January 1938, (T5551-T5610) and later another 19 (T8101 - T8119) making a total of 140 vehicles. Time showed the decision to build a tank to resist anti-tank weapons was an important one, for despite their limitations as a fighting tank they gave a good account of themselves in action with the 1st Army Tank Brigade in France in 1940.

They were abandoned when the B.E.F. evacuated Dunkirk and went out of service. One example of this vehicle (T 8106) is on display at the Royal Armoured Corps Tank Museum, Bovington. However, the drawing illustrates an earlier production machine than the Bovington exhibit but differs only in detail, confined mainly to the stowage of external fittings.

The hull is of single skin riveted construction and carries a crew of two, the Driver centrally located at the front and the Commander/Gunner in the Fighting Compartment. The turret is traversed by hand gear and mounts a single periscope in the roof.

The power comes from the well known Ford 90 degrees V-8 side valve engine at the rear of the vehicle and delivers it through a conventional single dry-plate clutch to a 4 forward and 1 reverse speed gearbox and thence to the steering brakes and clutches, final drive reduction gear and drive sprockets at the rear of the vehicle.

Four point suspension is employed and consists of four double rollers in each of four bogie frames and supported by a pair of leaf springs. All rollers are rubber tyred excepting those on stations 7 and 8 which are of steel. Each top run of track is supported by two double rubber tyred rollers.

Lt.Col. G.le Q. Martel turned his attention in 1937 to minesweeping. One of his experiments was the fitting of a plough to the front of an Infantry Tank Mk1 (T3433-HMH788). The plough was supported by a pair of girders pivotally attached to the hull sides and mounting a pair of rollers, one on each girder in line with and forward of the vehicle tracks. For travelling the plough could be raised by means of a chain driven from a power take-off from the rear of the vehicle. In practice it worked quite well in turning out the mines, but was limited to working in soft sand. Lack of engine power precluded the use of a heavier plough. John Fowler of Leeds were concerned with the development work.

Technical Specification for Infantry Tank Mark 1

Crew: 2

Weight, Combat loaded: 24640 lbs.

11 Long tons, 12.32 Short Tons 11.176 tonnes

Performance

Speed, Max. Road: 8 m.p.h. (12.9 Km.p.h.)

Trench crossing: 6' 6" (198 cm)

Step: 2' 6" (76 cm)

Min. Turning circle, skid

Ground pressure: 9.65 lbs/sq.ins (0.68 Kg/sq.cm)

Range (internal fuel), Road: 80 Miles (129 Km)

Power to weight ratio: Gross 6.36 HP/ton

Dimensions

Length overall: 16' 3½" (496 cm)

Length: 15' 11" (485 cm)

Width overall: 7' 8" (233.5 cm)

Width: across tracks, 7' 6" (228.6 cm)

Height: 6' 7" (200.5 cm)

Ground clearance: belly 1' 3½" (38.7 cm)

Fire height of gun: 5' 1" (155 cm)

Road wheel dia (overall) 1' 0" (30.5 cm)

Trackwork

Centres: 6' 4" (193 cm)

Length on ground: 9' 3" (282 cm)

Width: 11½" (29 cm)

Pitch: nominal 3½" (8.83 cm)

Number of links per track: 116

Mechanical Details

Engine: Ford 90 degrees V-8 side-valve, 3.1/16 in. bore x stroke 3½ in = 3620 cc 70 bhp @ 3300 rpm. normally aspirated gasoline, spark ignition.

Transmission: Single plate dry clutch, 4F & 1R speed gearbox

Steering: Clutch and brake

Suspension: Four point, each of four bogies carrying four double wheels controlled by a pair of leaf springs pivoted to the hull. Wheel stations 7 & 8 have steel bogies, the remainder rubber

Armament

Main: Vickers .5 in. or .303 in. water-cooled machine gun

Calibre, 12.68 mm (0.50 ins)

Traverse: turret 360 degrees. Operation: hand operated gear wheel

Elevation: plus 25 degrees. minus 15 degrees

Secondary armament: 2-4 in. smoke dischargers

Stowage

Ammunition, main armament: 4000 rds

Internal Fuel capacity: 42 Imp. gals. 50.4 U.S. gals. 191 Litres

Armour

Type: Cast

Hull, Nose upper: 2.50" (65 mm) at 20 degrees

Nose lower: 1.00" (25 mm) at 15 degrees

Glasis plate: 1.00" (25 mm) at 70 degrees

Drivers plate: 2.28" (60 mm) at 0 degrees

Sides, 2.28" (60 mm) at 0 degrees

Rear, upper: 1.92" (50 mm) at 0 degrees

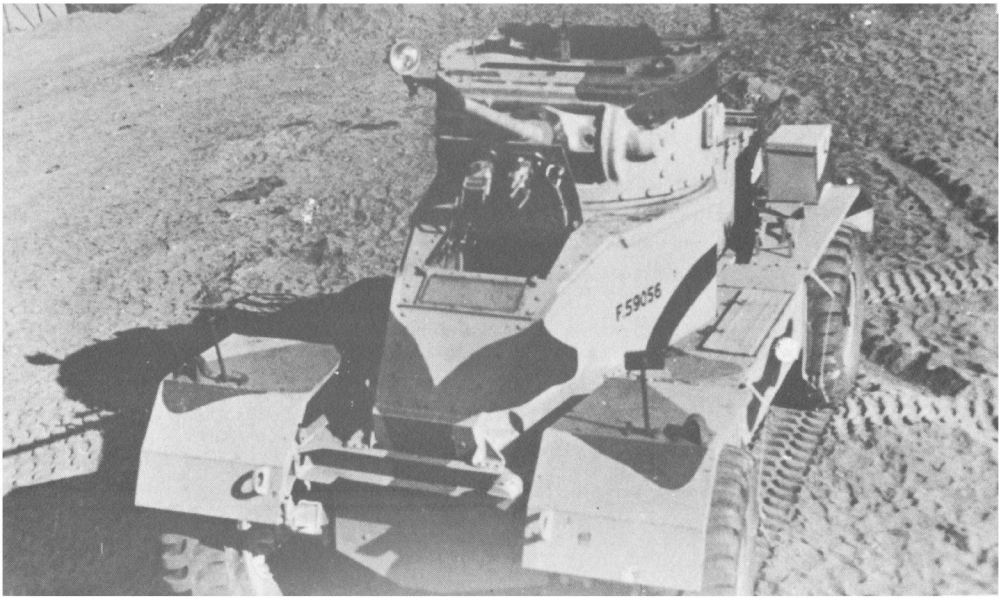
Decking: 0.36" (12 mm) at 90 degrees

Engine covers: 0.72" (20.2 mm) at 70 degrees

Belly, Front: 0.72" (20 mm) at 90 degrees

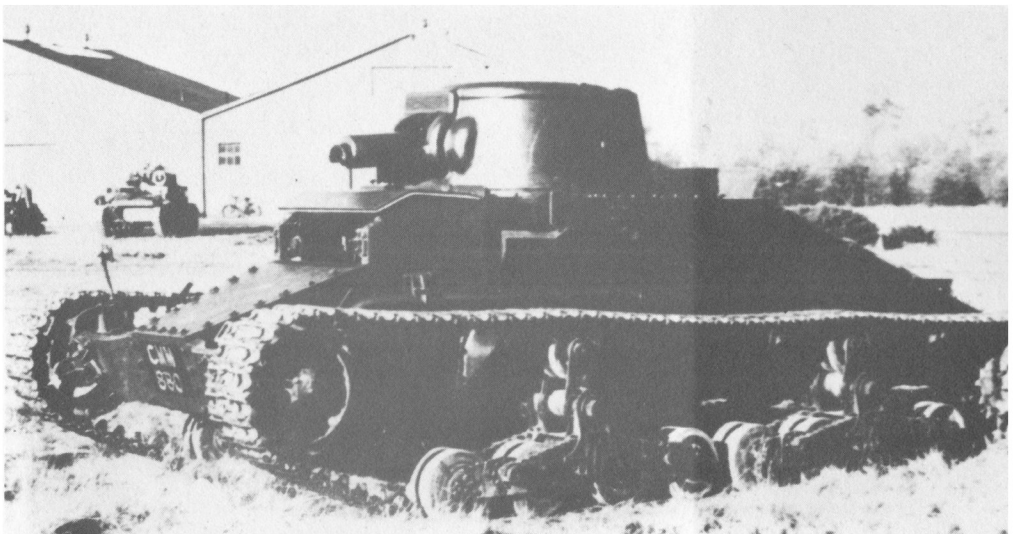
Rear: 0.36" (10 mm) at 90 degrees

NOTE: British Standard Angles: 0 degrees = Vertical
90 degrees = Horizontal



ABOVE: The first production version of AEC concept of a wheeled tank, using the basic components of existing vehicles, the Matador artillery tractor and turret from the Valentine tank, a very acceptable and economic vehicle resulted. (Royal Army Ordnance Corps Photograph)

BELOW: The Infantry tank Mark 1 was the original 'Matilda'. Its service life was very short as the bulk of the Armour equipment of the British Army was left behind after Dunkirk. Despite its pathetic Machine gun armament, the excellent heavy armour made it a formidable vehicle in combat. The standard German 3.7 cm Anti-tank gun was powerless when faced with a Mark 1. (Bellona Warpics Photo)



By ARMIN L. SOHNS.

From 1942 onwards German armour operating on the Russian Front came under ever increasing air attack. Thus requirements for special anti-aircraft vehicles were increased. However, such vehicles at that time, mainly based upon unarmoured semi-tracked vehicles, were in very short supply and in any event were not suitable for close co-operation with armoured track laying vehicles. So that each armoured vehicle would have a measure of protection under its own control orders were issued for the design of a suitable mounting for the 7.92 mm MG 34 machine gun. This mounting became available in late 1943 and was known as 'Fliegerbeschussgeraet' and was fitted to the following tanks:-

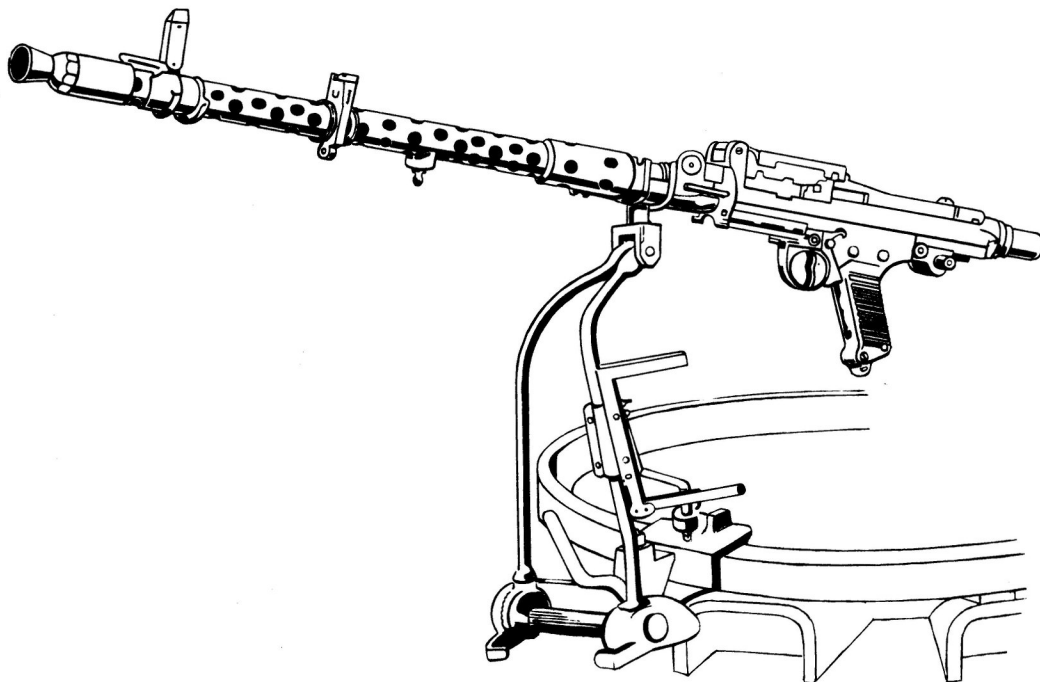
Panzerkampfwagen III Ausf. M/N.

Panzerkampfwagen IV Ausf. H/J (Bellona Prints Series 6. No. 22 GE)

Panzerkampfwagen 'Panther' Ausf A/G. (Bellona Prints Series 16. No. 62 GE)

Panzerkampfwagen 'Tiger' late Ausf E. (Bellona Prints Series 13, No. 49 & 50 GE)

Panzerkampfwagen 'Tiger' Ausf B. Porsche and Henschel turrets (Bellona Prints series 2, No. 8 GE)



A semi circular rail was fitted around the front of the Commanders cupola on these vehicles. The mounting brackets shown in the drawing are stored with the machine gun, within the tank until required. The mounting itself allowed a traverse of about 60 degrees, but it could be clamped to the rail at any point required. The machine gun was clipped into the mount and when in place could be elevated to nearly 80 degrees. The commander could therefore fire the machine gun with only his head and shoulders unprotected.

BELLONA WARPICS

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